

## **Accelerator Division EH&S Highlights September 2003**

### **New Accelerator Site Safety Warden**

Ned Walker, a term employee with the EH&S Department will be serving as Accelerator Site Safety Warden for the foreseeable future. T3 updated Accelerator Site table of areas to reflect safety warden change to Ned.

### **Hurricane Preparations and Impact**

IH staff spent the majority of the week before the hurricane in preparation. All essential equipment and supplies were moved to the Test Lab. All outdoor storage was moved inside.

RadCon ensured that tunnel sumps pumped down, and diverted to ground and HRSD sump was pumped down and connected to end station dewatering to handle hurricane rainwater. RADCON trailers were without permanent power for one week.

All CEBAF and FEL PSS systems were secured for the weather related shut down. During the shutdown, all devices interlocked through the PSS were administratively locked and tagged OFF to maintain configuration control. There were several lessons learned in the system shut down process that will be incorporated in to SSG procedures.

### **General CEBAF Shutdown Notes**

IH group has been “patrolling the tunnel “ in an effort to maintain visibility. Two items addressed:

1. Staff complaints that a 208 cable is strung across the roadway in front of SLSB: Cryogenics group was tapping into outlet inside the service building to support vacuum work. There was a cable protector, but it did not cover the exposed cable adequately and cars were observed driving over it. Jonathan Creel followed up and corrected the situation.
2. Staff observed working on a staircase ladder that was closed and used as an extension ladder: obviously the wrong tool for the job, not to mention a valid OSHA violation. The area of use is behind the magnet stands in the arc. Staff member stated that extension ladders are too long, and he minimized the risk of the ladder slipping by wedging it against the magnet stand base. Referred the matter to the supervisor, and supplied information on smaller extension ladders that are available commercially. Most important: referred them to Industrial Safety group for further evaluation.

IS (Accelerator Safety Warden) noted an operating vacuum cart was found at station point #520 connected without a permanent or temporary GFCI in the supply line. It was later determined that the cart belonged to the SRF group and that the two technicians shut down the pump cart, and installed a GFCI that morning, as needed.

### **Task Hazard Analysis and Technical Work Documents, Mitigation**

T3 reviewed final OSP on magnet thermo scans at N. Wilson’s request. While the cover sheet contained 98% of signatures, Neil omitted a SSG review. It was passed to SSG. Some key items require change/clarification. The document will be passed

## **Accelerator Division EH&S Highlights September 2003**

back to Neil for action. IH and T3 assisted R. Wines, N. Wilson, and T. Whitlatch with revisions to SOP on flushing magnets, and now power supplies, with citric acid solution. Interesting note on MSDS accuracy: the MSDS for the solution listed it as a corrosive liquid, but did not list the pH of the solution. When IH contacted the manufacturer, he realized that the pH had been omitted. The pH of the stock solution is 3.5, so the corrosivity is somewhat overstated. T3 assisted G. Biallas with developing procedures to test stray magnetic fields in FEL vault. Procedure will be modeled after N. Wilson's Magnet IR Scan OSP.

T3 sent ESS a request for technical determination regarding OSHA finding on portable receptacles with flexible electrical cords and metallic receptacle boxes that were found in Transportainer 836 during the OSHA audit. Unable to identify clear guidance on acceptable practice, the T3 submission includes a request for written guidance that is traceable back to standards listed in our WSS.

IH conducted Task hazard analysis (and lead worker training) for Operations Group. Lead brick is being placed around a new detector in the Hall C transport tunnel. About 50 to 60 painted bricks are involved.

RadCon wrote RCOP for bringing FEL down to restricted access with limited duty SSO. RadCon also wrote RWP and assisted Hall C in removal of exit beam line and reviewed the TSOP for magnet acid flush. RadCon updated Assigned Radiation Monitor (ARMs) webpage for G0 experiment. RadCon installed shielding for, and moved CARM neutron probe in the area of penetration in FEL that has direct line of site to the beam line.

### **Training and Testing**

SSG is preparing specific training on electrical hazards based on OSHA training material and preparing material on utility vehicle training to meet OSHA/ASME requirements.

IH Fit tested and respirator trained injector group for respirator use when applying and removing insulation related to bake-outs. This is a follow-up to discussion with injector group staff using clean room masks to protect themselves from the insulation. Now we use NIOSH approved respirators, trained and medically cleared staff. IH also received a request from Hall A for "hood" type positive pressure respirators for staff who have beards. IH will conduct training and issue the respirators pending hazard analysis of the job. IH presented Lead Worker Training and Laser Safety Training Classes.

IS provided special scaffold training to Cryogenics Group, held special Lock, Tag & Try class.

RadCon completed sealed source custodian re-training to include new custodian duties: custodians responsible for providing sources to RADCON for semi-annual

## **Accelerator Division EH&S Highlights September 2003**

inventory and leak tests. RadCon conducted Radiation Worker I class and Assigned Radiation Monitor (ARM) Refresher training class.

### **Sampling, Surveys, and Support**

IH conducted Hall A sampling for surface contamination on beryllium windows removed from the beam line and conducted Accelerator sampling for lead exposure on staff painting lead bricks in the tunnel. IH also conducted sampling was conducted for lead work around a new detector in the Hall C transport tunnel.

Work on EHS punch list for acid neutralization upgrade. Issues still to address include Installation of portable local exhaust, sludge analytical results that will determine if the waste is hazardous, and work space: may have to address bump hazards, clearances etc.

RadCon supports Buildings 91 and 95 Maintenance Work. Both buildings surveyed and opened and auxiliary pumps turned on 9/17. Pump vibration analysis performed in Building 91.

IS load tested new klystron lifting fixture and assisted in two lifts for Cryo, one for Hall C.

### **Accidents, Incidents, Lessons Learned, and Tracking**

Accident investigation: back injury in Test Lab: Test Lab is investigating, IH supporting. IH met with Pat Morton and the injured staff member this morning. Interesting note: the staff member had planned to perform the same task (in reverse) today. Medical Services is assisting with the ergonomics assessment. Repeat of the task was successful: IH and Dr. Chandler reviewed the task that resulted in the lower back injury. The problem with the task: awkward position and limited viewing of the task by the participants. The task was moved, and further consultation with Medical Services is necessary.

Incident investigation: mild electrical shock in tunnel. This was the first incident to be reported and investigated under the new reporting/investigation regime sent to the division on 09/03/03. The notification and investigation were completed on time.

SSG reviewed OSHA inspection final report finding and reviewed Columbia Accident Report and recommendations for lessons learned.

T3 prepared a report on events that are missing from the EH&S Tracking System for the line self assessment (LSA) period that ran from 1 Sep 2002 through 31 August 2003. Highlights of missing items: 5 Reportable Injuries, 17 First Aid, 9 Notable Events, 3 Occurrences. T3 prepared a report on tracking system and EHSLOG usage for CY 2003. Highlights: EHSLOG entries have dropped by > 50% per month since Feb – Apr 2003 timeframe.

## **Accelerator Division EH&S Highlights September 2003**

T3 received inquiry from, Dr. Mannan, a professor at Texas A&M's Mary Kay O'Connor Process Safety Center, to partner with JLab for research involving the EH&S Tracking System. T3 followed up with D. Lusk about the possibility and he says it's possible under a CRADA. T3 will follow up with Dr. Mannan as to the nature of his research proposal.

T3 initiated changes to the tracking system:

1. Working continues on moving the EH&S Tracking System over to an MIS server. T3 reviewed the production copy and it looks good.
2. Resolved FEL ARR Matrix problem regarding the color code change as updates are posted. For more info, see ccpr 23650.
3. Reorganized the field lists in the pop-up windows that appear when downloading search results to Excel so that fields to appear in a designated order in the spreadsheet.

### **Hazardous Waste / Material Control and Environmental Reporting**

IH assisted Joan Campbell with action items generated by the Property Management Audit: several pieces of equipment needed immediate attention: ground missing from capacitor bank, cryo-pumps that were pressurized, and a container filled with univolt oil was suspected of containing PCBs.

Mystery substance down the drain in the men's room: thanks to alert staff, found that abrasive slurry is being disposed of down the drain. The MSDS was consulted and it turns out that if diluted appropriately and if permission is given by HRSD, then it may be allowable. The practice was stopped and Linda Even was notified.

Sludge waste not hazardous: the sludge generated by the acid neutralization system was tested and can be disposed of as non-hazardous waste.

RadCon completed sealed source leak tests completed – no leaking sources. RadCon Submitted monthly groundwater report for August and provided corrected copy for the July Groundwater report due to erroneous results from a malfunctioning flow meter. Radiation Budget calculations for E03-008 with a 1.88 cm thick Carbon target indicate a boundary dose of 7.2 mrem for a one week run. Clearly adjustments to the set up will need to be made.

### **Personnel Safety Systems, Instrumentation, Diagnostics**

RadCon organized meetings on and presentation of Beam Loss Ion Chamber arrangement and silicon carbide beam position detector development. SSG Met with Erik Abkemier to discuss shielding calculations required for injector/north linac separation. SSG suggested that we use the extra machine down time to perform some measurements in the injector.

PSS work on the ODH System Upgrade continues. Current work includes replacement of cells in linac ODH monitors, installation of conduit and tubing for next generation under way. Additional lights and horns installed in the tunnel, i.e. you

## **Accelerator Division EH&S Highlights**

### **September 2003**

will now have visual indicators in the tunnel as well as additional alarm horns to alert to ODH conditions. Cost estimates for replacing current system with pressure stable system are approximately \$225k.

SSG is also removing PSS equipment from Hall A laser hut. The FEL UPS back on line and supporting limited duty operations of FEL, and Jumpers installed in zone 2 and 4 for the “Ready” waveguide pressure signals to the PSS. At this time the waveguides are disconnected for window replacement.

The BSY PLC system is in the middle of the upgrade to Quantum equipment. Due to the weather related delays, that project will be at least one week behind schedule. Extra time due to hurricane recovery will be used to recondition the south linac SSG interface chassis. This has been put off for six years.

### **Training / Travel for Staff Development**

RadCon staff attended Hall B and C Safety Awareness training and SCBA training.

T3 attended the Workshop on Investigating and Reporting of Incidents & Accidents (IRIA) held on September 16th & 17th. The T3 Group Leader presented a talk at the workshop on the JLab EH&S Tracking System that generated considerable interest among attendees from University of Glasgow, NTSB, Swedish Rescue Services, Texas A&M’s Mary Kay O’Connor Process Safety Center, and NASA Glenn Research Center.

## **Administration Division Notes for EH&S Committee**

*For meeting of 10/3/2003*

### **Facilities Management**

#### ***Projects with EH&S Implications***

- Retention Pond - To facilitate future site developments, a retention pond is required for storm water management. The A/E is proceeding with soil testing and surveying. (PM - Chandra)  
Estimated Design Completion Date 12/12/03  
Est. Construction Start Date 3/02/04
- North Connector Road - A new road will be constructed between Lawrence Drive and Rutherford Road at the south end of Rutherford Road. (PM - Chandra)  
100% Submittal Submission 9/29/03  
Est. Construction Award Date 1/05/04
- Re-roof Accelerator Service Buildings - After completion of the Central Chiller project, the HVAC units will be removed and the Service Buildings will be re-roofed with a foam roofing system. (PM - Chandra)  
Proposals are due on 9/29.  
Est. Construction Award Date 10/15/03

#### ***ARC Building – Laboratory Ventilation –***

Chronic problem exists with individual fume hoods going into low-flow-alarm conditions. Overall system capacity and/or flow balance among the three floors have been evaluated: 6000 cfm less than original performance and previous measurements. Most loss is through bypass dampers at the roof-top fan. Damper repairs have greatly reduced leakage. Next step is to evaluate consultants' recommendations for better control at the fume hoods, and possibly remove bypass damper in conjunction with installation of variable-speed drive on the fan. (PM - Jones)

### **Emergency Management**

***Hurricane Isabel*** gave a thorough wring-out of our hurricane preparation and recovery processes – some of which had been mere words heretofore. A good lessons-learned session came up with substantive observations and recommendations.

#### **A few highlights of preparation activities leading up to the storm:**

- Golf cars stored in experimental halls
- A large inventory of sand bags pre-filled and palletized for distribution and use
- Grounds policed for potential wind-driven missiles
- Hall flood gates (lesson learned from previous storm) utilized
- Checklists and procedures were in place before the emergency
- Director's Command Staff/Severe Weather Team met early and often to coordinate
- Lab closure decisions affected by consideration of staff home responsibilities

#### **Storm Impact:**

- Helium loss caused by the extended and wide spread electrical power outage
- Damage to two structures (Bldgs 49 & 11) and several vehicles – all related to trees
- Newport News made restoration of electrical service to JLab the #2 priority, second only to the local hospital
- No injuries during shutdown
- No lost data or damaged documents
- Perishable food in cafeteria protected

## Post-Storm Recovery

- Voice mail system was a valuable source of information for those staff who had phone service.
- Local media cooperated with JLab to get the Lab's status out to a wide audience
- Rapid page system worked for some of staff
- Two-way pagers afforded the best communication for senior management
- Facilities Management staff were on site Friday to begin making the site safe for return of other essential personnel
- Grounds subcontractors responded immediately to clear debris
- Shutting down CANS-secured buildings and prevented staff from entering until safety was assured

Although JLab survived Isabel with minimal physical damage and no injuries, not everything worked as planned or as well as we would have liked. Following are some examples from the suggested **opportunities for improvement:**

- Moving shut-down day & time causes problems for Operations and Computer Center (and maybe others). They have a fixed "cycle time" and once into it, it can't be slowed down without further disruption and inefficiency.
- Cell phones, land phones, and pagers all were affected in many areas.
- Two-way pagers proved to be the most reliable communications method. More are needed for DCS and staff with emergency roles.
- Local media had incorrect information on Lab's re-opening day/time.
- E-mail server shut down before many had seen latest closure information. Web page had out-of-date info when it came back up.
- Rapid-page lists were incomplete or out of date.
- We continue to struggle a bit over the concept of "essential personnel" and what it means in different groups and situations.

All of these issues have owners who are working to fix or improve wherever possible.

A side note: Trees – the species, their overall condition, grooming or pruning methods – all have major influence on their ability to withstand wind storms.

There is also the Dennis-Floyd effect: Saturated soil prior to a wind storm predisposes trees to blow down.

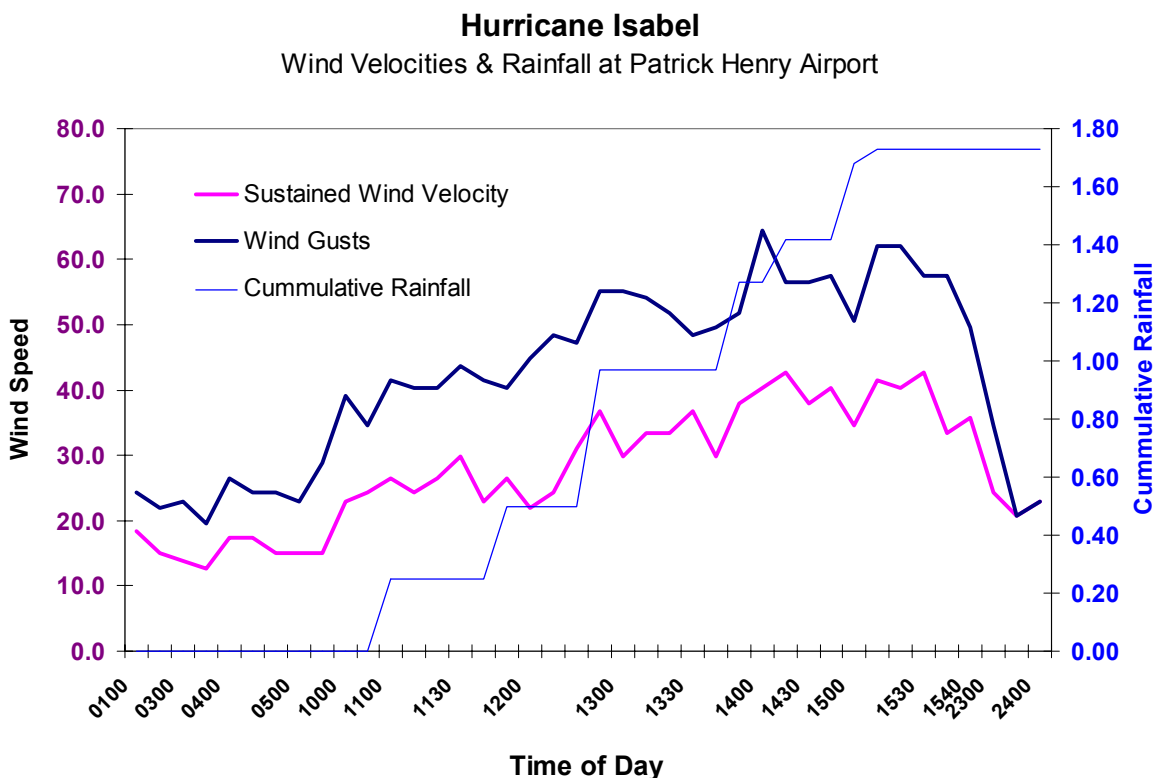
An excellent guide to pruning trees to maximize their wind tolerance can be found at:

<http://www.ces.uga.edu/pubcd/C806.htm>

| Least Wind Resistant Species |  |                               |
|------------------------------|--|-------------------------------|
| box elder                    |  | water oak                     |
| ash                          |  | sweet gum                     |
| hickory                      |  | red cedar                     |
| sycamore                     |  | black gum                     |
| red maple                    |  | slash pine                    |
| sugar maple                  |  | bald cypress <sup>(1)</sup>   |
| yellow poplar                |  | loblolly pine                 |
| magnolia                     |  | dogwood                       |
| cherry                       |  | live oak                      |
| southern red oak             |  | longleaf pine                 |
|                              |  | <b>Most Resistant Species</b> |

Tree Species Resistant to Storm Damage from Least Resistant to Most Resistant (after "How to Evaluate and Manage Storm-Damaged Forest Areas." 1982 USDA Forest Service Forestry Report SA-FR 20)

***And, by the way... Isabel was less than a full hurricane by the time it reached us.***



***The wind-speed instrument at the airport failed in late afternoon of the 18<sup>th</sup>, but winds were subsiding by then.***

### **Miscellaneous**

J. Kelly attended the annual Professional Conference on Industrial Hygiene, and attended two PDC's while there:

#### ***Principles of Biosafety***

Risk-assessment approach to recognition, evaluation, and control of occupational biohazards. Primarily based upon the NIH guidance document, "Biosafety in Microbiological and Biomedical Laboratories." Covered regulatory framework for Biosafety, including Risk Group designations. Also work practices and engineered controls – including classification system and features of biological safety cabinets. Patriot Act and Homeland Defense have had some significant impact on traditional Biosafety practices.

#### ***Business Analysis for In-House Industrial Hygiene & Safety Staff***

Slightly grandiose title for an in-depth look at planning and reconfiguring EH&S into a shared services model using Chevron Corp's experience as a case study. This is a highly customer-focused approach with strong attention to economy and proficiency. Goal is to deliver services competitive with outside sources to the greatest extent possible while retaining core expertise and institutional memory.





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## **EH&S Reporting Activities for September 2003**

- As of September 30, Jefferson Lab had achieved [137](#) consecutive days without a lost-time injury. The Lab record is [455](#) consecutive days without a lost-time injury. There was one recordable injury in September - a Facilities Management subcontract employee had a jaw injury on September 26<sup>th</sup> while working on the accelerator site.
  
- **Occurrence Reporting**
  - Extensive follow up activities were conducted in September for an August JLab 'near miss' event that was reported to the DOE ORPS as an "Off Normal" occurrence (the lowest of the three ORPS reporting levels). This event was an August 13<sup>th</sup> minor electrical shock to an Accelerator Div. technician from a vacuum cart in the beam switchyard. The event was investigated by a team composed of line management, division EH&S staff, and electrical subject matter experts. The results of this investigation concluded that the potential for a physiologically significant electrical shock injury did not exist. As the event was reported as 'near miss' based on a preliminary report, a recommendation for ORPS report cancellation was generated for management review.
  - A September 12<sup>th</sup> minor electrical shock to an Accelerator Div. engineer in the accelerator tunnel was evaluated for occurrence reporting. The event investigation concluded that the potential for a physiologically significant electrical shock injury did not exist, and reporting to the DOE ORPS network was not necessary. The event will be tracked internally for follow up actions.
  
- An all staff memorandum for National Fire Prevention Week (October 5-11) was prepared for management review. Additional information on JLab building evacuation muster points was incorporated into the memorandum in response to an EH&S Committee recommendation.
  
- **Environmental Management System**
  - Jefferson Lab must establish an Environmental Management System (EMS) under a new DOE requirement. The system, which will interface with the JLab Integrated Safety Management System Plan, must be in place by the end of CY 2005. EH&S Reporting will be playing a lead role to see that this is accomplished.

➤ **Work Smart Standards (WSS) Set**

- Proposed 2002 changes to the WSS Set, including using current ANSI standards instead of versions from the 1960s are working their way through the change process.
- EH&S Reporting is working with the Policy and Manuals Group to ensure new or modified hazards or standards become addressed appropriately in the EH&S Manual.
- Proposed changes to EH&S Manual Ch. 2420 are being processed.

➤ **National Environmental Policy Act (NEPA)**

- CEBAF and FEL Upgrade Environmental Assessment (EA)
  - EH&S Reporting continued to work with Project Management staff to prepare summaries for the activities planned for inclusion in the proposed 16 GeV EA.
  - Work on the 16 GeV and Hall D checklists continued.
- EH&S Reporting is working with other laboratory staff to address other NEPA items, including actions related to the new CEBAF Center addition construction project.

**Physics Division  
EH&S Activities  
September  
2003**

**For the month** – The EH&S Group priority was oversight and assistance to staff and user community during the scheduled maintenance period of the experimental halls.

**Experimental Readiness and Work Control Documents**

Reference Jefferson Lab EH&S Manual Chapter 3120 – Experimental Review, and Chapter 3320 - Temporary Work Permits

Readiness reviews are required by Jefferson Lab management for all major installation experiments. The purpose of these reviews is to assure that the experiment will have a high probability of being scientifically successful and operating in an efficient and safe manner.

There were no formal experimental readiness reviews in September.

There was one Temporary Operational Safety Procedure and no new Operational Safety Procedure, Standard Operational Procedure, or Experiment Readiness Certificate given approval.

**Inspections**

Reference Jefferson Lab EH&S Manual Chapter 5100 - Internal Inspections

Four formal inspections identified no new recordable action items, however, two previous action items remain open.

**Hurricane Isabel**

Reference Jefferson Lab EH&S Manual Chapter 3510 T4 - Severe Weather Procedures

Timely guided preparations for Hurricane Isabel were executed with no reported storm related items, issues or concerns to experimental halls and or division support facilities on the accelerator site. However, Trailer 11, office space for users, sustained repairable structural damage from the Category 1 Saffir-Simpson Hurricane Scale storm.

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